

In the Claims:

Please cancel claims 17-20 and 30, and add new claims 31-35. This listing of claims will replace all prior versions and listings of claims in the application:

1.-21. (Canceled)

22. (Previously Presented) A mechanism to adjustably apply a counter-balance force in response to a load comprising:

a spring;

a pulley including an input groove and an output groove;

an input cable having a first end coupled to the input groove and a second end connected with the spring;

an output cable having a first end coupled to the output groove and a second end extending from the first end;

wherein the pulley is adapted to transfer a counter-balance force to the second end of the output cable; and

an adjustable end plug connected between the input cable and the spring;

wherein the adjustable end plug includes a helical groove within which a coil of the spring is receivable; and

wherein the adjustable end plug can be threaded along the coil of the spring to adjust the counter-balance force applied by the spring in response to the load.

23. (Canceled)

24. (Previously Presented) A mechanism to adjustably apply a counter-balance force in response to a load comprising:

a spring having a plurality of coils;

an end plug screwed onto one or more of the coils so that the one or more coils is received in a helical groove of the end plug, wherein a spring constant of the spring is adjustable by selectively advancing or retreating the end plug along the coils of the spring;

a dual pulley rotatable at a shaft, the dual pulley including:

- an input groove formed in a first surface; and
an output groove formed in a second surface;
wherein one or both of the first surface and the second surface has a radius that spirals outwardly from the shaft;
an output cable connected with the output groove; and
an input cable connected between the input groove and the end plug;
wherein the spring applies a counter-balance force to the input cable, which counter-balance force is transmitted to the output cable by the dual pulley.
25. (Previously Presented) The mechanical mechanism of claim 24, wherein:
the dual pulley further comprises an input pulley fixedly connected to an output pulley by a spline hub; and
the input pulley includes the input groove and the output pulley includes the output groove.
26. (Previously Presented) The mechanism of claim 24, wherein:
both of said first surface and said second surface have a radius that spirals outwardly from the shaft; and
said first surface spirals outwardly in a direction that is opposite to a direction that said second surface spirals outwardly.
27. (Previously Presented) The mechanism of claim 24, wherein:
the dual pulley is a dual helical pulley having an input groove that spirals outwardly in a counter-clockwise manner and an output groove that spirals outwardly in a clockwise manner;
28. (Previously Presented) The mechanical mechanism of claim 24 wherein the radius of one or both of the first surface and second surface is defined by a torque profile.
29. (Previously Presented) The mechanical mechanism of claim 28 wherein the torque profile is parabolic.
30. (Canceled)

31. (New) A spring system having an adjustable spring constant, comprising:
an end plug including a helical groove in a face of the end plug having a helix-angle that varies parabolically;
a helical extension spring;
said end plug is adapted to be mated with the helical extension spring so that the coil of the helical extension spring is received in the helical groove; and
a cable connected to the end plug, wherein when the cable is placed in tension by a load, the face of the end plug is urged against the coil of the helical extension spring;
wherein a counter force applied by the helical extension spring in response to the load is adjustable by repositioning the end plug along the helical extension spring.
32. (New) The spring system of claim 31, wherein the helix-angle of the helical groove decreases relative to a fixed location along the coil and within the helical groove as one or both of the coil of the helical extension spring and the end plug is adjusted to increase the counter force applied by the helical extension spring.
33. (New) The spring system of claim 31, wherein:
the helical groove is a first helical groove and the face is a first face; and
the end plug further includes a second helical groove in a second face opposite the first face, the second groove having a helix-angle that varies parabolically; and
when the end plug is mated with the helical extension spring, the coil of the helical extension spring is guided from the first helical groove to the second helical groove.
34. (New) The spring system of claim 33, wherein:
the helix-angle of the first helical groove decreases relative to a first fixed location along the coil and within the first helical groove and the helix-angle of the second helical groove increases relative to a second fixed location along the coil and within the second helical groove as one or both of the coil of the helical extension spring and the end plug is adjusted to increase the counter force applied by the helical extension spring.
35. (New) The spring system of claim 31, wherein the cable is an input cable, and wherein the spring system further comprises:

a pulley including an input groove and an output groove;
the input cable having a first end coupled to the input groove and a second end connected with the end plug;
an output cable having a first end coupled to the output groove and a second end extending from the first end;
wherein the pulley is adapted to transfer a counter-balance force to the second end of the output cable.